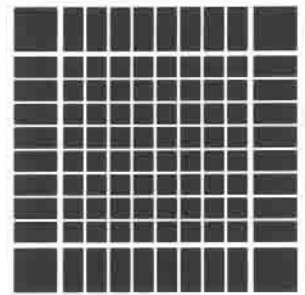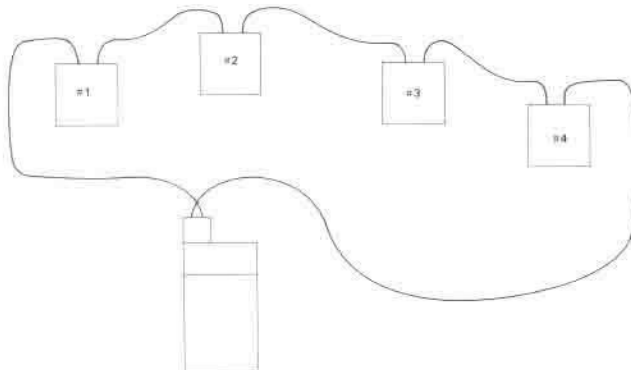**HEWLETT PACKARD**

HP-IL
Component
Data Sheet

What is HP-IL?

The Hewlett-Packard Interface Loop (HP-IL), is a bit-serial interface designed for small, low cost, battery-operable systems. It is intended for use in field portable and simple bench-top systems that use highly-portable controllers, such as Series 40 and Series 70 computers.

In HP-IL systems, devices are connected by two-wire cables leading from the output port of one device to the input port of the next, until all devices form a closed loop.

HP-IL Licensing.

Hewlett-Packard Company is willing to make available the information that is needed to design the HP-IL interface into products at the component level. Certain special components have been designed which are necessary in devices incorporating the HP-IL interface: the HP-IL connector, the pulse transformer set, and the HP-IL integrated circuit. These components are manufactured by Hewlett-Packard Company or by vendors licensed by Hewlett-Packard Company. Hewlett-Packard Company does not plan to require additional licenses of manufacturers who utilize these HP-IL interface components to manufacture products that are compatible with the HP-IL interface standard.

In order for an assortment of products to be coupled into a properly operating system, they must be compatible with the HP-IL interface standard. Hewlett-Packard Company is committed to this compatibility goal and is prepared to support the HP-IL interface standard through licenses and by other available means to ensure universal product compatibility.

Components Key to the HP-IL Interface.

Three components are key to implementing the HP-IL interface standard: the HP-IL integrated circuit, the HP-IL transformer set, and the HP-IL panel receptacle.

HP-IL Integrated Circuit: The general-purpose HP-IL integrated circuit provides a convenient interface from most standard microprocessors to HP-IL. To the microprocessor, the chip appears as eight memory or I/O locations. Reading or writing data in these registers causes corresponding action on the loop (transmitting a frame, setting the service request bit, etc.), as well as the appropriate data transfer. The integrated circuit handles bit coding, serial/parallel conversion, and the time-critical aspects of HP-IL protocol. However, most of the protocol is implemented in the user's microprocessor firmware.

HP-IL Transformer Set: The HP-IL transformer set provides electrical isolation between devices on the loop as well as voltage level conversion and impedance matching. The transformer set and its associated circuitry help protect the sensitive CMOS integrated circuit from both electrical noise and electrostatic discharge. The circuitry also minimizes the electrical noise that could potentially be radiated from the HP-IL integrated circuit.

HP-IL Panel Receptacle: The HP-IL panel receptacle provides a foolproof mechanical method of connecting HP-IL devices. The following features help to ensure correct HP-IL system connection:
- The cable is polarized to prevent inverted link up.
- The receptacle is keyed so that two transmit ports cannot be incorrectly connected together.
- The plugs are mated so that a device can be removed from the loop and the cable ends plugged together.
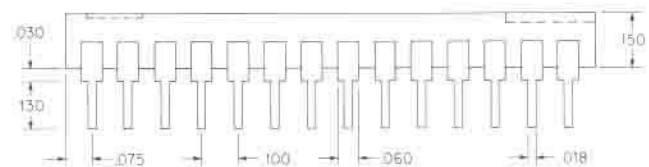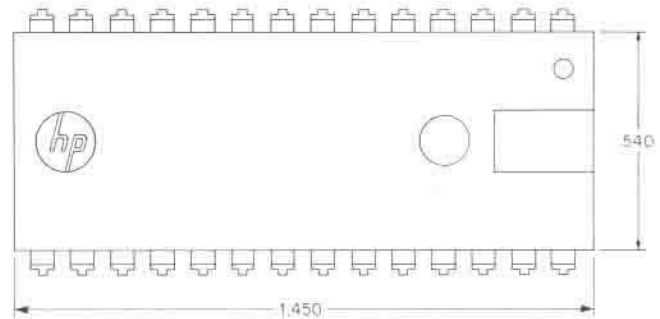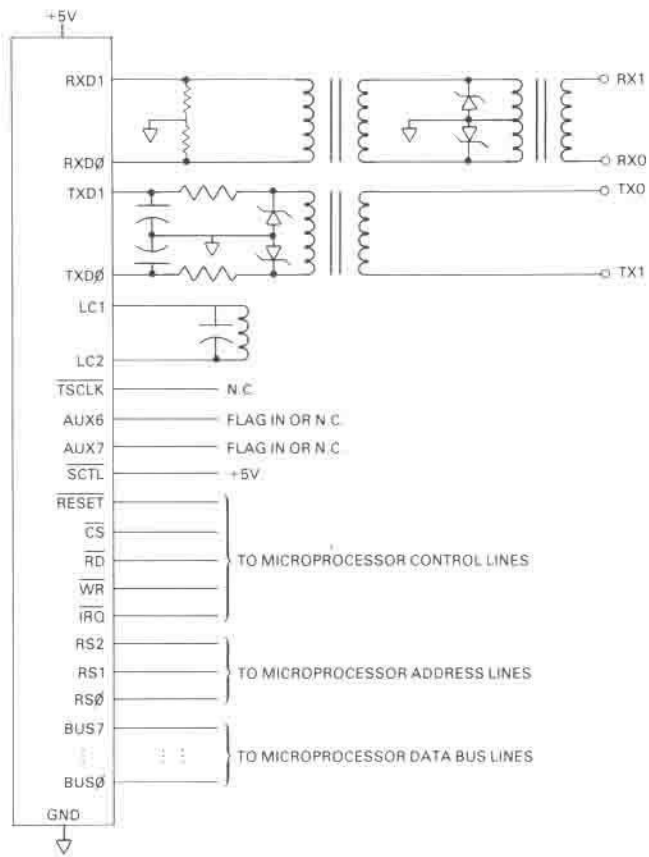
For more information, contact your HP sales representative or local sales office.
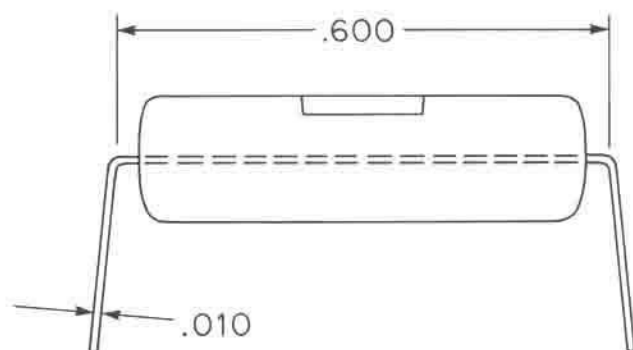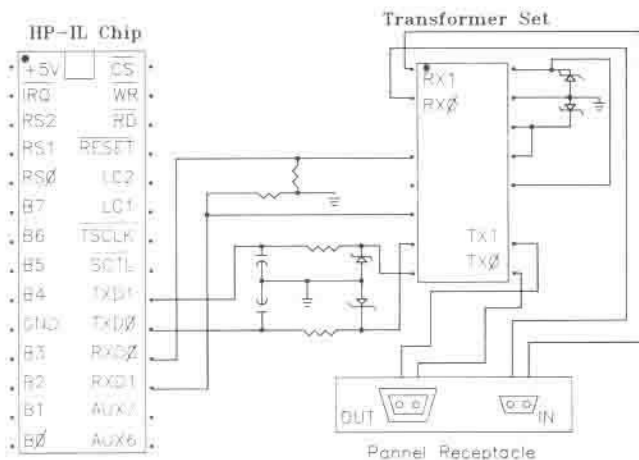
General-Purpose HP-IL Integrated Circuit

1LB3-0003
CMOS—28-Pin Plastic Dip Package

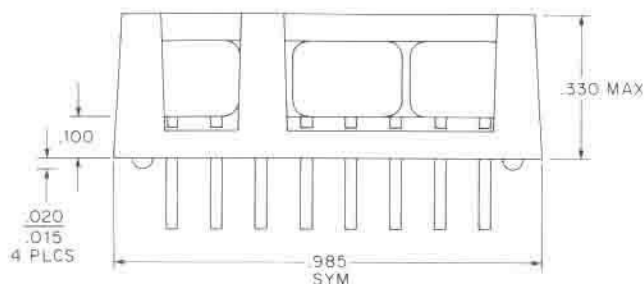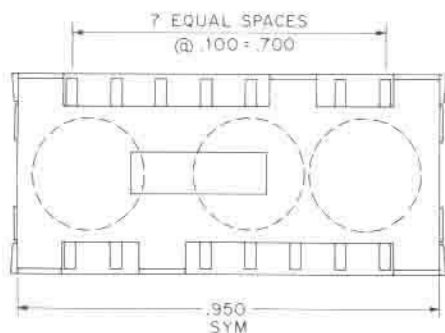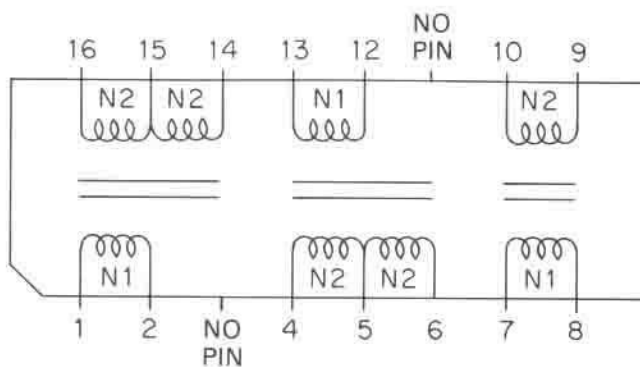|			
VDD	1	28	$\overline{CS}$
$\overline{IRQ}$	2	27	$\overline{WR}$
RS2	3	26	$\overline{RD}$
RS1	4	25	$\overline{RESET}$
RSØ	5	24	LC2
BUS7	6	23	LC1
BUS6	7	22	$\overline{TSCLK}$
BUS5	8	21	SCTL
BUS4	9	20	TXD1
GND	10	19	TXDØ
BUS3	11	18	RXDØ
BUS2	12	17	RXD1
BUS1	13	16	AUX7
BUSØ	14	15	AUX6

VDD — Supply Voltage (+5V)
IRQ — Interrupt Request (Open-Drain Output, Active Low, TTL Compatible)
RS2, RS1, RSØ } Register Select (Inputs, TTL Compatible)
BUS7 ⋮ BUSØ } 8-Bit Data Bus (Bidirectional, TTL Compatible)
GND — Ground (ØV)
AUX6, AUX7 } Auxiliary Flags (Inputs, On-Chip Pull-Ups)
RXDØ, RXD1 } HP-IL Receiver Data (Inputs)
TXDØ, TXD1 } HP-IL Transmitter Data (Outputs)
SCTL — System Controller Flag (Input, Active Low)
TSCLK — External Clock (Input, On-Chip Pull-Up)
LC1, LC2 } On-Chip Oscillator LC Circuit Connections
RESET — Reset Line (Input, Active Low)
RD — Read Enable (Input, Active Low)
WR — Write Enable (Input, Active Low)
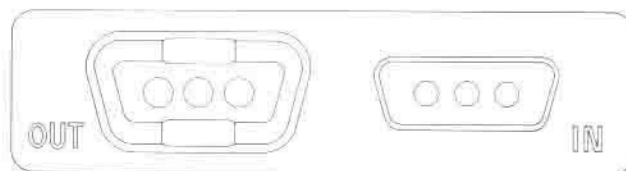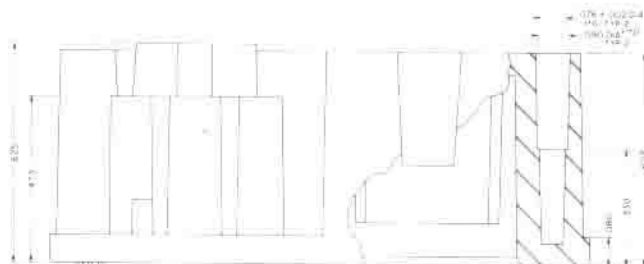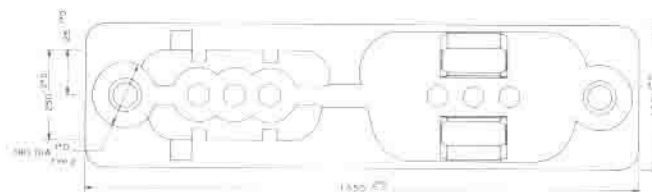CS — Chip Select (Input, Active Low)

Typical HP-IL Circuitry

HP-IL Transformer Set
16-Pin Dip Header

9100-4226

.200 SYM .300 SYM .440 MAX

.025 SQUARE TYP

```
   16    15    14    13    12    NO    10     9
                                 PIN
  ┌─────────────────────────────────────────┐
  │  N2  │ N2  │     │ N1  │           N2    │
  │ 0000 │0000 │     │0000 │          0000   │
  │                                          │
  │  ════  ════       ════  ════       ════  │
  │                                          │
  │ 0000 │     │0000 │0000 │     │    0000   │
  │  N1  │     │ N2  │ N2  │     │     N1    │
  └─────────────────────────────────────────┘
    1     2    NO    4     5     6     7     8
              PIN
```

7 EQUAL SPACES
(@ .100 = .700)

.950 SYM

.330 MAX

.100

.020
.015
4 PLCS

.985 SYM

HP-IL Panel Receptacle
0950-0852

OUT ∘∘∘   ∘∘∘ IN

Accessories

HP-IL Cables

82167A	0.5 meter
82167B	1 meter
82167D	5 meter

HP 82166C HP-IL Interface Kit

Complete component-level HP-IL documentation, four complete sets of parts for prototype evaluation, and HP-IL development software for use on Series 40 and Series 70 computers.